

**B.Tech. SEM -IV ( Computer) 2014 Course (CBCS) : WINTER - 2018**

**SUBJECT: ENGINEERING MATHETICS – III**

**W-2018-2337**

Day : Tuesday  
Date: 13/11/2018

Time : 02.30 PM TO 05.30 PM  
Max. Marks : 60

**N. B. :**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable calculator is **ALLOWED**.
- 4) Assume suitable data, if necessary.

**Q. 1 a)** Solve:  $(D^3 + 4D)y = \sin 5x \cdot \cos 3x$ . **(05)**

**b)** Solve:  $\frac{dx}{y} = \frac{dy}{-x} = \frac{dz}{x e^{x^2+y^2}}$  **(05)**

**OR**

**a)** Solve:  $(D^2 + 9)y = \frac{1}{1 + \sin 3x}$  by the method of variation of parameters. **(05)**

**b)** Solve:  $(1+x)^2 \frac{d^2y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2 \sin [\log (1+x)]$ . **(05)**

**Q. 2 a)** Show that the function  $e^z$  is analytic. **(05)**

**b)** Evaluate  $\int_{1-i}^{2+i} (2z+4) dz$  along the path  $x = t+1, y = 2t^2 - 1$ . **(05)**

**OR**

**a)** Find the map of the circle  $|z-i|=1$  under the mapping  $w = \frac{1}{z}$ , into the  $w$ -plane. **(05)**

**b)** Evaluate  $\oint_c \frac{4z^2+z}{(z-1)^2} dz$ , where 'c' is the contour  $|z-1|=2$ . **(05)**

**Q. 3 a)** Find the Fourier Cosine transform of  $f(x) = 2e^{-5x} + 5e^{-2x}$ . **(05)**

**b)** Find the Fourier transform of  $f(x) = \begin{cases} -3, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases}$  **(05)**

Hence evaluate  $\int_0^\infty \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$

**OR**

**P. T. O.**

a) Find  $Z\{f(k)\}$  if  $f(k) = \left(\frac{1}{2}\right)^{|k|}$  for all  $k$ . (05)

b) Find  $Z^{-1}\left[\frac{z}{(z-1)(z-2)}\right]$ ,  $|z| \geq 2$ . (05)

Q. 4 a) Find Laplace transform of  $e^{-3t} \int_0^t \sin 2t \, dt$ . (05)

b) Find the inverse Laplace transform of  $\frac{2s+5}{(s+1)(s-2)}$  (05)

OR

a) Using Laplace transform solve the following differential equation: (05)

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = te^{-t}, y(0) = 1, y'(0) = -2.$$

b) Find the Laplace transform of  $L[\sin t U(t-4)]$ . (05)

Q. 5 Solve the equation by LU decomposition method: (10)

$$2x + 3y + z = 9,$$

$$x + 2y + 3z = 6,$$

$$3x + y + 2z = 8.$$

OR

a) Find a real root of the equation  $x^3 - 2x - 5 = 0$  by the method of Regula-Falsi (05) to three decimal places.

b) Evaluate:  $\int_0^1 \frac{dx}{1+x^2}$  using Trapezoidal rule and Simpson's  $\left(\frac{1}{3}\right)^{rd}$  rule taking (05)

$$h = \frac{1}{4}.$$

Q. 6 a) In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads (05) and 4 tails.

b) A bag contains 8 white and 6 red balls. Find the probability of drawing 2 balls (05) of the same colour.

OR

Compute the first four moments about the mean, coefficient of skewness and kurtosis for the following frequencies distribution : (10)

Number of jobs completed	0-10	10-20	20-30	30-40	40-50
Number of workers	6	26	47	15	6

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